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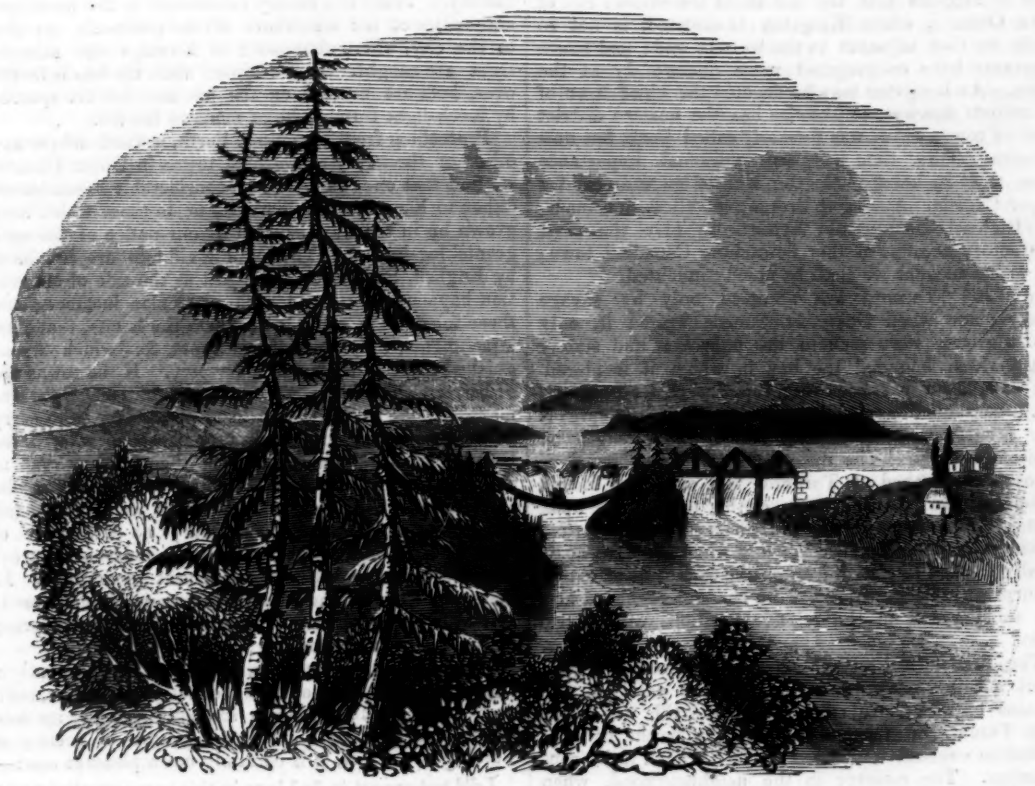
CANADIAN SKETCHES.



SETTLEMENT AND BRIDGE OF BY-TOWN ON THE OTTAWA.

IV.

Upper Canada and its Inhabitants.

When it is considered that Upper Canada has been peopled almost entirely since the system of emigration has been established; or, in other words, that before the extension of emigration Upper Canada contained few but native Indian inhabitants,—it may easily be conceived that all the features presented by the towns are of a modern character. No cathedrals, no time-honoured buildings, no ancient customs, present themselves to our notice; but everything wears a new aspect.

One of the Upper Canadian towns which have risen to importance with great rapidity, viz., Kingston, is advantageously situated at the junction of Lake Ontario with the St. Lawrence, so as to command the navigation of both. The foundation of the town took place in 1783, and the streets were regularly planned, running at right angles with each other. Mr. Bouchette estimated the number of houses in 1830 at about seven hundred; but matters have progressed so rapidly since then, that it will be better to take the more recent information of Sir Richard Bonnycastle. An early settlement built by the French occupied the site of Kingston; but the name was Anglicized when the English took possession of Canada. Although Kingston consisted of but a few houses in 1783, it now presents a front of more than a mile in length, on the Ontario, and extends half a mile inland.

The lower part of the town, near the lake, is very level and convenient; but the ascent towards the newer part is rather sudden, along the edge of the limestone rocks, which then begin to show themselves, and are but scantily covered with soil. The upper portion of the town is beautifully laid out on a vast plateau of rock, which extends a long way towards the woods. From this elevated station, a magnificent view is obtained of the lake, the river, the forts, the islands, and the forests. The principal streets are Store Street, leading from the lake to the back country; and four streets running parallel with the lake. At the end of one of these streets is the Cataragui bridge, a very ingenious wooden structure, built by two American carpenters, and extending, on loose stone piers of eighty feet span, across the wide estuary of the river, in a troubled and deep water. It forms a pleasing addition to the scenery, and a very useful ornament to the town; but as its materials are perishable, and its piers not of solid masonry, the bridge is scarcely deemed worthy of such a rising and important town. The streets which approach to the water are much occupied by wharfs and quays, constructed on so large a scale that steam-boats containing a thousand passengers can draw up at the side of them. It has been remarked that when certain

canals and railroads which are now in progress shall have been completed, Kingston will no doubt become a great city, as the trade of all the surrounding countries, from the Atlantic to Lake Superior, and from Hudson's Bay to the United States, will centre in its magnificent roadstead.

But although Kingston is thus happily situated, there are circumstances which have retarded its growth very signally. Emigrants, although of course desirous of being in a position to buy and sell with the inhabitants of a considerable town, attach still more importance to the possession of a rich and fertile spot of ground. Now it happens that the soil about the eastern end of Lake Ontario, where Kingston is situated, is not so fertile as that adjacent to the western end; and hence emigrants have congregated more numerously at the latter. As Kingston may be deemed the chief town of the eastern districts, so likewise has the western district its chief town, which was formerly called York, but now Toronto. This, too, has had additional importance given to it by being made the seat of government for Upper Canada. Among the recent travellers in Canada, Sir Richard Bonnycastle appears to give the most satisfactory account of this flourishing Canadian town; and to his account we shall be chiefly indebted.

In 1794 Toronto was occupied only by savage Indians; and when Governor Simcoe visited it, only two wigwams were seen in the unbroken and stately forest which bounded the bay in which it is placed. But now, such has been the rapidity of its progress, that it contains fifteen thousand inhabitants, and spreads over a surface of more than two miles in length by a mile in breadth. The memory of the "red man" is almost extinguished at Toronto; for, excepting during the occasional visits of the civilized Indians, upon matters of business with the government, a native Indian is seldom seen there; and when there, as he is usually clothed like an European, he excites no attention or surprise. Such have been the changes produced in a few short years, in the relative positions of the two races!

The French had a small square palisadoed fort here, about a mile westward of the present garrison, the remains of which are still visible; and this was called Fort Tarento or Toronto, supposed to be the name of an Italian engineer employed by the French in its construction. The country in the neighbourhood, when cleared by the British, was gradually called Toronto; while the village erected by the British settlers in 1794 obtained the name of York. The village grew in size and importance; and at length, in 1834, Sir John Colborne, now Lord Seaton, restored to it the former name of Toronto, made it a city, and constituted it the seat of the government for Upper Canada.

Toronto stretches nearly east and west along the shores of a spacious and beautiful bay, and consists of six parallel streets, each nearly two miles in length, intersected by cross ones at right angles, at every two or three acres distance, and the whole depth being about a mile. The value of property within the town is enormous. Acre-lots sold by the government, even at some distance from the heart of the town, have obtained so much as five or six hundred guineas each. Building-ground, in the populous streets, is worth from ten to twenty pounds per foot; and in this way many persons have suddenly become wealthy; for the value of the land a few years ago was very small. Until about the time of the changes made by Lord Seaton, the buildings in Toronto were mostly of wood, stone not being found in sufficient quantity in the neighbourhood. It has however been found that the soil is an excellent brick-clay; and this has led to the employment of a more durable material. In some of the principal streets, not only have substantial brick houses been built, but the shops display the London luxuries of plate-glass windows, and other attractions of a similarly showy kind. None of the public buildings display much splendour. The principal structures are the Parliament Buildings; the Public Offices; the English, the Scotch, and the Roman Catholic Churches; Dissenters' Chapels; the Bank of Upper Canada; the Market-house; the City or Town-hall; and the Upper Canada College.

In Toronto unite the great roads from the Niagara and Western districts; the George Street, a straight road of thirty-six miles from Lake Simcoe; and the Eastern Road, leading to Kingston and Lower Canada. All these roads are well laid out for several miles from the city. There is a fishery established by the municipal authorities on the lake-shore of the peninsula, opposite to the city, where abundance of herrings and salmon-trout are caught. In the winter when the bay is frozen over, huts are erected on the ice, and fish are speared by torch-light through holes made in the ice.

Proceeding from Toronto to Perth, to Goderich, or any other of the newly established towns in Upper Canada, we find that one and all bear a considerable resemblance either to Kingston and Toronto, or to those which have grown up in the way depicted in our notice of the emigrants' log-houses. The humble villages are inhabited by English, Scotch, or Irish, just as the tide of emigration happened to turn in each particular instance; and these inhabitants carry with them the habits, thoughts, attachments, religion, style of dress, &c., which distinguished them in their native country. If the towns are of larger size and importance, they contain many government, official, military, and legal personages, who carry with them from England the tone of social intercourse befitting their station. Hence, there is nothing to describe in reference to the inhabitants of Upper Canada, so marked and singular as that which we had to detail concerning the Lower Canadians; no admixture of French and English, of feudal with modern tenures; of modern dresses with dresses of past generations. In the smaller towns and villages the social intercourse is generally kind and friendly, the interests of all rendering mutual aid advantageous.

In the larger towns, however, there is frequently a display of assumption, of vanity, of petty party spirit, such as frequently marks a town suddenly shooting up into importance. If Mrs. Jameson's picture of society at Toronto be correct, it is certainly not a pleasant one:—

I did not expect to find here in this new capital of a new country, with the boundless forest within half a mile of us, on almost every side—concentrated, as it were, the worst evils of our old and most artificial social system at home, with none of its *agrémens*, and none of its advantages. Toronto is like a fourth or fifth rate provincial town, with the pretensions of a capital city. We have here a petty colonial oligarchy, a self-constituted aristocracy, based upon nothing real, nor even upon anything imaginary; and we have all the mutual jealousy and fear, and petty gossip, and mutual meddling, and mean rivalship, which are common in a small society of which the members are well-known to each other, a society composed, like all societies, of many heterogeneous particles; but as these circulate within very confined limits, there is no getting out of the way of what one most dislikes; we must necessarily hear, see, and passively endure much that annoys and disgusts any one accustomed to the independence of a large and liberal society, or the ease of continental life. It is curious enough to see how quickly a new fashion, or a new folly, is imported from the old country, and with what difficulty and delay a new idea finds its way into the heads of the people, or a new book into their hands.

The concluding paragraph is more satisfactory.

Yet, in the midst of all this, I cannot but see that good spirits and corrective principles are at work; that progress is making; though the march of intellect be not here in double quick time, as in Europe, it does not absolutely stand stock still.

Perhaps we cannot better illustrate the manner in which towns and villages spring up in Upper Canada,

than by noticing the remarkable spot represented in our frontispiece, viz., *By-Town*. If we notice on a map the relative positions of Montreal and Kingston, we shall see that the one lies near the mouth of the Ottawa, and the other near the mouth of the Rideau canal; and we shall also see that these two join at By-town; whereby a triangle is formed, of which Montreal, Kingston, and By-Town constitute the angles, and the St. Lawrence, the Ottawa, and the Rideau canal, constitute the sides. The existence of rapids in the St. Lawrence, between Montreal and Kingston, has led to the more circuitous water-route by the Ottawa and the canal; and this system arose thus:—Until about twenty years ago, the whole district around what is now By-Town was a vast wilderness, both on the eastern shore of the Ottawa, which is in Lower Canada, and on the western, which is in the Upper province. An enterprising American travelled in quest of lands, and proceeded up the Ottawa; he examined the country on the east bank, at the spot now under our notice, and quickly discovered its advantages. Here, in the heart of the wilderness, eighty-five miles above Montreal, was a magnificent river, flowing from afar through excellent lands, with abundance of timber, and mountains of iron ore. He knew well how to bring these resources into profitable operation; and immediately proceeded to Quebec, where he obtained a grant of the lands. He drew hundreds of settlers to the place; forests rapidly disappeared, and were succeeded by houses, inhabitants, corn-fields, meadows, and all the rural features of civilized life. Thus arose the town or village of *Hull*, situated on the eastern or Lower Canadian bank of the Ottawa; a town which has gradually risen to importance.

So far for the eastern shore. We have now to allude to the western. Colonel John By, an enterprising military engineer, was employed by the colonial government to construct a canal from the Ottawa near Hull, to the St. Lawrence near Kingston, in order that the passage from Montreal to Kingston might be made without encountering the rapids of the St. Lawrence. The difficulties which he surmounted in following this plan were so many and so vast that they have induced Sir R. Bonnycastle to award him a meed of praise somewhat excessive, viz., that,—

If ever any man deserved to be immortalized in this utilitarian age, it was Colonel John By.

The Colonel commenced operations in 1826. He selected the mouth of the canal (the Rideau,) at the spot where By-Town now stands; and carried the canal for a distance of a hundred and fifty-three miles through Upper Canada to Kingston. The work was carried on with astonishing rapidity, through a country beset with every kind of engineering difficulties, and at an expense of not much less then a million sterling.

The canal being thus planned, a town at its eastern mouth became necessary; and such a town was gradually formed, and named after the engineer. By-Town consists of two portions, the Upper and the Lower Town, and is built on opposite sides of the valley through which the canal enters the Ottawa. The lower town is inhabited chiefly by traders, and the upper by private residences. The streets are laid out as regularly as the nature of the ground will admit, and are generally wide. From the lower town a fine and picturesque road leads to the house where Colonel By lived, a neat and elegant residence, from whence one of the finest views in Canada can be obtained.

Hull and By-Town being thus formed, Colonel By conceived the bold expedient of carrying a bridge over the Ottawa from one bank to the other, at a part where falls and rapids make the river nearly impassable. A portion of this very singular bridge is seen in our frontispiece. The river is chequered by masses of rock, and small islands, which the Colonel availed himself of as parts of his line of communication. First, there is an iron bridge of one arch thrown over a branch of the river, from the shore to a small island; then a wooden bridge over a ravine in the island itself; next a wooden bridge between this island and a second; then an embankment along the third island; then three bridges, of wood, iron, and stone, respectively, to cross the channels which separate the second, third, fourth, and fifth islands, (all of which are pretty nearly in a straight line); and lastly, a stone bridge to arrive at the opposite shore. The whole distance across is about half a mile, made up of these several portions.

Colonel By died a few years ago; but his name will live in connexion with these bold engineering achievements, which are always more difficult and note-worthy when made in a new country. The bridge is said to have partly gone to decay since the Colonel's death.

Toronto gives us a picture of an Upper Canadian town established mainly by the government; By-Town of one formed by an individual who drew round him artis ans and workmen; and Hull of one established by a settler in the Bush; and these may be taken as types of the growth of all the towns in the province, both as respects the buildings which constitute the towns, and the tone of society among the inhabitants.

In earth, in ocean, sky, and air,
All that is excellent and fair,
Seen, felt, or understood,
From one eternal cause descends,
To one eternal centre tends,
With God begins, continues, ends,
The source and stream of good.

JAMES MONTGOMERY.

Men need not go out of their daily work and stated engagements, to be favoured with the vouchsafements of God's bounty: nay, by staying steadily and working diligently within their line of duty, in that state of life to which it has pleased God to call them, they are most likely to be visited by the bounty of God.—BISHOP MANT.

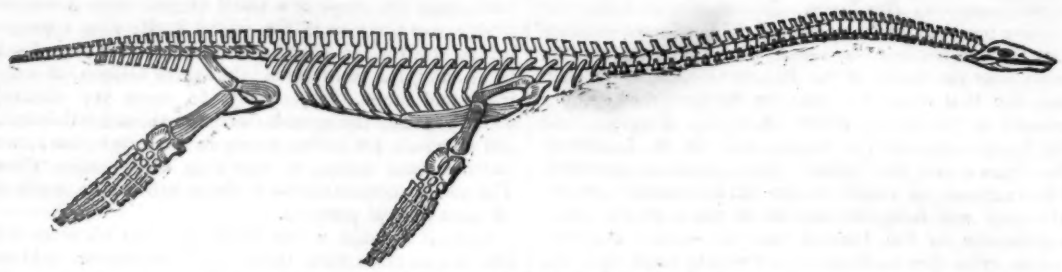
When slumbers, soft as noiseless snow,
Descend upon mine eyes,
Lord! let me sink to rest as though
I never more should rise!
Let Thy blest Spirit, from my breast,
The world and sin have driven,
So that if death these lids have prest,
My soul may wake in heaven!—A. M. PORTER.

A lady applied once to the late benevolent Mr. Reynolds of Bristol, on behalf of an orphan. After he had given liberally, she said, "When he is old enough, I will teach him to name and thank his benefactor." "Stop," said the good man, "thou art mistaken; we do not thank the clouds for the rain. Teach him to look higher, and thank Him who giveth both the clouds and the rain."

There is a tear more sweet and soft
Than beauty's smiling lip of love;
By angels' eyes first wept, and oft
On earth by eyes like those above:
It flows for virtue in distress,
It soothes, like hope, our sufferings here;
'Twas given and it is shed, to bless—
'Tis sympathy's celestial tear.—?

Examples of religious consideration on some particular occasions are not proofs, that Religion is firmly and durably established in the bosom. Gold is not known to be genuine until it has stood the test of fire. The crop is not estimated by the blade, but by the harvest. Wait until religion has, for some time, been tried by the temptations of life, before you pronounce on its reality.—GISBORNE.

The Bible is by far the most inexhaustible Book in the world, even laying aside its Divine origin altogether. For its great antiquity, simplicity of narrative, splendour of poetry, and wise and holy injunctions, there is no work once to be compared with it.—JAMES HOGG, *the Ettrick Shepherd*.



THE FOSSIL PLESIOSAURUS.

HAVING in a former number* given a description of the Ichthyosaurus, or Fish Lizard, we now proceed to notice its remarkable ally, the *Plesiosaurus*, so named in consequence of its great resemblance to the lizard tribe, *plesion* being the Greek word for *near*.

This remarkable reptile, which is known only in a fossil state, was of gigantic size. Its body and paddles greatly resembled those of the Ichthyosaurus, but the former was rather more bulky, and the latter longer, and possessed more power. It had a very long neck closely resembling the neck of a swan, terminating with a head like that of a lizard, at the same time partaking of the character of the head of the Ichthyosaurus. The neck, backbone, and tail together, were composed of upwards of ninety vertebræ, thirty-three of which formed the neck. These vertebræ did not bear so great a resemblance to the fish tribe as those of the Ichthyosaurus, nor were they so well adapted for rapid motion. The ribs were like the Chameleon's, being formed to contain a capacious set of lungs, and to rise or fall as those lungs became inflated or emptied.

Such are the strange combinations of form and structure in the Plesiosaurus; a genus, the remains of which, after interment for thousands of years amidst the wreck of millions of extinct inhabitants of the ancient earth, are at length recalled to light, and submitted to our examination, in nearly as perfect a state as the bones of species that are now existing upon the earth†.

The Plesiosaurus appears to have lived in shallow seas and estuaries, and to have breathed air like the Ichthyosaurus and the modern *cetacea* or whale-tribe. Five or six species have already been discovered, some of which attained an enormous size.

We cannot describe the habits of this remarkable creature better than in the words of the late Reverend W. Conybeare, who discovered the genus.

That it was aquatic (he says) is evident, from the form of its paddles; that it was marine is almost equally so, from the remains with which it is universally associated; that it may have occasionally visited the shore, the resemblance of its extremities to those of the turtle may lead us to conjecture; its motion, however, must have been very awkward on land; its long neck must have impeded its progress through the water; presenting a striking contrast to the organization which so admirably fits the Ichthyosaurus to cut through the waves. May it not, therefore, be concluded (since in addition to these circumstances its respiration must have required frequent access of air) that it swam upon or near the surface; arching back its long neck like the swan, and occasionally darting it down at the fish which happened to float within its reach? It may, perhaps, have lurked in shoal water along the coast, concealed among the seaweed, and raising its nostrils to a level with the surface from a considerable depth, may have found a secure retreat from the assaults of dangerous enemies; while the length and flexibility of its neck may have compensated for the want of strength in its jaws, and its incapacity for swift motion through the water, by the suddenness and agility of the attack which they enabled it to make on every animal fitted for its prey, which came within its reach.

Before concluding our account of this most extraordinary creature, we must notice a particularly striking part of its organization namely, its paddles, which were an improvement upon the fins of fishes, forming, at the same time, the type of the legs of quadrupeds and of the arms of mankind.

Thus (says Dr. Buckland) even our own bodies and some of their most important organs are brought into close and direct comparison with those of reptiles, which, at first sight, appear the most monstrous productions of creation; and in the very hand and fingers with which we write their history we recognise the type of the paddles of the Ichthyosaurus and Plesiosaurus.

J. G. C.

SOME of Astley Cooper's pranks (when a boy) were of the most eccentric and amusing description, while others must have required a degree of cleverness and ingenuity in their execution, and a command over the expression of his features such as boys at his period of life are not often found to possess. The following is one which he often related at his table, and which, as he described it, never failed to set his listeners into a roar of laughter, in which he himself always heartily joined. It has lately been corroborated to me by persons still living at Yarmouth.

Having taken two pillows from his mother's bed, he carried them up to the spire of Yarmouth church, at a time when the wind was blowing from the north-east, and as soon as he had ascended as high as he could, he ripped them open, and shaking out their contents, dispersed them in the air. The feathers were carried away by the wind, and fell far and wide over the surface of the market-place, to the great astonishment of a large number of persons assembled there. The timid looked on it as a phenomenon predictive of some calamity,—the inquisitive formed a thousand conjectures,—while some, curious in natural history, actually accounted for it, by a gale of wind in the north blowing wild fowl feathers from the island of St. Paul's. It was not long, however, before the difficulty was cleared up in the doctor's house, where it at first gave rise to anything but those expressions of amusement which the explanation, when circulated through the town, is reported to have excited. I think my uncle used to say that some extraordinary account of the affair, before the secret was discovered, found its way into the Norwich papers.—*Life of Sir Astley Cooper.*

HIM fortune cannot sink, nor much elate,
Whose views extend beyond this mortal state;
By age when summoned to resign his breath,
Calm, and serene, he sees approaching death,
As the safe port, the peaceful silent shore,
Where he may rest, life's tedious voyage o'er:
He, and he only, is of death afraid,
Whom his own conscience has a coward made;
Whilst he, who Virtue's radiant course has run,
Descends like a serenely setting sun,
His thoughts triumphant Heaven alone employs,
And Hope anticipates his future joys.

SOAME JENYNS.

EVERY happiness is the more valuable, as it is capable of being made more general.—DEAN STANHOPE.

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* See *Saturday Magazine*, Vol. XXII., p. 136.
† BUCKLAND'S *Bridgewater Treatise*, p. 203.

NATURAL HISTORY OF CHALK.

II.

THE geographical distribution, general properties, and geological nature of chalk were noticed in the former part of this paper. We now proceed to state its chemical qualities and agricultural uses.

The chemical name of chalk is Carbonate of Lime. *Lime*, the well known material for mortar and cements, is the oxide of the metal Calcium. When pure, its colour is a very pale grey; it has a sharp and burning taste, and when exposed absorbs watery vapour and carbonic acid gas from common air, and so becomes changed into carbonate of lime. *Carbonic-acid Gas* is formed by a mixture of carbon with oxygen. It is this gas which escapes upon the opening of a bottle of the "soda-water" of the shops. The refreshing qualities of spring-water arise from the same acid, of which water spontaneously absorbs its own bulk. Carbonic-acid Gas is heavier than atmospheric air, and may be poured from one vessel to another like water; for this reason it is frequently found to occupy the lower parts of wells, caverns, and mines, and is the Choke-damp of the miners. In these cases it exhales from crevices in the earth, being produced from deep and unknown sources. By its union with lime is formed the *carbonate of lime*. This is the most abundant compound of lime which occurs in nature, and it is calculated that one eighth of the entire crust of the globe is constructed with it. "It exists in all river and spring water, and consequently in the ocean, and is an essential ingredient in all fertile soils." Crystallized carbonate of lime is called Calcareous spar; what is termed Iceland spar is this substance in its primitive or simplest form, and of extreme purity. All the varieties of marbles and limestones, chalks and marls, are also principally composed of it.

CHALK, then, is to be considered as a Carbonate of Lime, which is composed of . . . . Carbonic Acid, containing { Carbon / Oxygen } Lime, containing { Calcium }

Carbonate of lime is sparingly soluble in water, but is dissolved by carbonic acid in excess, and hence its presence in the spring water of calcareous districts. The quantity of carbonic acid contained in water, over and above that required to form the carbonate of lime, is expelled by boiling. The carbonate of lime which was dissolved in that excess of acid is precipitated, and forms the grey flaky crust that may be observed upon the inside of tea-kettles and boilers.

Chalk effervesces strongly with acids. If diluted sulphuric acid be poured over it, its carbonic acid gas will be set free, and escape into the atmosphere, while the lime will unite with the former acid to form sulphate of lime. In analyzing soils, muriatic acid is used for the detection and separation of chalk, or carbonate of lime. Lime having a greater affinity for that acid than for the carbonic acid, the latter escapes in the form of gas, and muriatic acid and lime remain under the name of muriate of lime, otherwise called chloride of calcium. As, however, the muriatic acid also dissolves, with the lime, some of the iron which is a constant ingredient in soils, and likewise takes up a very small quantity of the alumina, or matter of clay, two other processes, the description of which would be too technical for our present purpose, are necessary for the correction of these probable errors.

If chalk is burnt in close vessels its chemical constitution remains unchanged. Sir James Hall exposed some powdered chalk to great heat and pressure. He succeeded in fusing it without the escape of carbonic acid; the product being a close and compact form of carbonate of lime, resembling marble, instead of soft and porous chalk. It is thus that marble is, in fact, supposed to be prepared in nature, deep within the bowels of the earth, from a loose and porous carbonate of lime subjected to enormous heat and pressure.

If chalk, however, or limestone, is burnt in the open air, as in a kiln, chemical decomposition ensues. Water and carbonic acid are driven off at a red heat; and caustic lime remains. This, when mixed with any moist, fibrous, vegetable matter, forms a nutritive manure. But lime, when exposed to air, absorbs water and carbonic acid, and is changed again into the carbonate; it is, therefore, necessary that when used for manure it should be ploughed into the soil as speedily as possible, and not left in heaps upon the surface.

In agriculture, chalk should be considered with respect to its separate action as a soil, and subsoil. The chief ingredients in soils are flinty sand, lime, and alumina, or the matter of clay. Neither of the two first, in their pure state, constitute a fertile soil.

Chalk, or lime, may abound in a higher proportion than clay; and sand in a higher proportion than either clay or chalk, without causing barrenness. The sterility of sand is proverbial; extensive tracts of chalk occur in France, which are from their poverty almost uninhabited; and the chalk districts of England support but a scanty population compared with that of other portions of the island which are as exclusively devoted to agriculture.—*Practical Chemistry for Farmers*, by Joshua Trimmer.

Where, however, these soils, which by themselves are unproductive, are mixed up together either by art or nature, they constitute a fertile land. The tract of country which extends from near Sittingbourne to the foot of Broughton hill, bounded on the north by the estuary of the Thames, and on the south by chalk hills, is an example of the improvement of barren soils.

The soil is a calcareous loam, formed of the mingled ruins of the chalk, of that stratum of clay called the London clay, and of the sands and gravels which occur towards its lower part. The superior productiveness of this tract of country to the bare sides and summits of the chalk hills, or to those points where the surface consists of uncovered clay, as between Broughton and Canterbury, or of sand and gravel, as at Bexley Heath, is visible to the passing traveller.

When mixed with fine siliceous, or flinty sand, and finely divided clay, chalk constitutes a "loam."

The soils best adapted (says Abercrombie) for moderating the excesses, and compensating the deficiences of heat and moisture in different seasons are compositions of sand, pulverized chalk, and finely divided clay, with a proportion of animal or vegetable matter.

A chalky soil is highly advantageous to garden crops, provided it be not too near the surface; as a soil it is barren, but as a subsoil excellent.

In the Isle of Thanet, and other districts, where the subsoil is chalk to a considerable depth, the verdure of the grass, and of the young trees and shrubs, is often retained during parching seasons, when, in many other situations, the grass is entirely scorched, and the trees lose their leaves, owing to the continuance of dry weather: this was particularly observable in the hot summer of 1818. Chalk absorbs moisture readily, and retains it tenaciously; hence, in hot, dry summers, it gradually affords moisture to the roots of plants at a time when more open and porous soils are comparatively deprived of moisture.—TOWERS'S *Domestic Gardeners' Manual*.

"Chalk," says the author of the *English Gardener*, "if it be too near the top is not good; but it is better than clay or gravel, and by means of trenching, chalky soil may make a very good garden: for chalk never burns in summer, and is never wet in winter; that is to say, it never causes stagnant water. It absorbs it, and retains it, until drawn up by the summer sun. And hence it is that the chalky downs are fresh and green, while even the meadows in the valleys are burnt up, so as to be perfectly brown."

With respect to the depth of mixed soils necessary to convert the chalky subsoil into an advantageous bottom, some misapprehension has existed. Mr. Towers observes,

After the lapse of some years, and enlarged experience and

observation, I have found reason to change my opinion as regards the depth of fruit-tree borders. I have seen the finest fruit produced by wall-trees, whose roots rested upon a bed of sheer chalk, scarcely twelve inches below the surface; and it stands to reason that, where trees are trained, in order to check the *growing principle*, and to induce *fertility*, luxuriance of growth should not be stimulated by a *deep bed* of rich and nutritive earth. . . . We do not require luxuriance but a regular production of medium wood, which will ripen early; such wood alone is qualified to bear fruit in sufficient abundance.

Upon land which contains chalk at or near the surface snow lies longer perhaps than upon any other soil under similar conditions. This circumstance would seem to mark it as somewhat cold for vegetation, if we were unacquainted with the fact that snow cherishes terrestrial and vegetable warmth by preventing the radiation of heat. In the hotter months, this radiation of heat is, from chalk, accompanied by evaporation of moisture, which renders the local climate inferior, on the score of health, to a drier situation. In the very proportion in which it is, under these circumstances, favourable to vegetation, is it weakening to the powers of animal life. The constant damp warm atmosphere prepares the human constitution to receive disease more readily, and to retain it beyond the usual periods. It forms a rapid channel for the diffusion of noxious gases that arise from organic decompositions. But if the surface of the land, and the precincts of dwelling-houses, are kept clean, and the excess of rains that is not required for agricultural wants drained into proper reservoirs, this rock cannot be considered otherwise than healthy.

The qualities of *manures* depend upon their physical, or mechanical, and chemical characters. The physical properties of chalk, as a manure, are its porosity, its attraction for water, and its rapid disintegration after the absorption of water. Clay is neither porous to admit either rains or atmospheric air in sufficient quantities, nor is it naturally broken up into such small fragments as permit the easy extension of the roots of plants between their interstices. But it is evident that it would be rendered more porous and disintegrated by the addition of chalk. The latter, crumbling down under the action of atmospheric moisture, is ploughed into the clay, and effectually prevents it from caking again together. The land becomes less *stiff*, and is worked with a less amount of labour. These are the mechanical actions of chalk; its main chemical effects are to add lime to soils deficient in it; and to fix and saturate free acids, and some acids in combination, naturally existing in the soil, and which are prejudicial to vegetation. Chalk, at the rate of from twenty to forty tons per acre, has long been used with great advantage on the clays of Essex.

Abercrombie remarks that as both chalk and clay have an attraction for the fluid and volatile solutions of oil (which occur in manures,) a limited portion of these earths contributes to form a rich and generous soil. In the formation of a fruit garden lumps of chalk form an appropriate foundation, which is to be covered with loam to the depth of eighteen inches.

The supply of water obtained from chalk for domestic purposes is deficient at high levels unless wells are sunk to a great depth. A good body of water commonly rises from the chalk which lies under the London clay, although the latter yields no water. This part of the subject has, however, already been explained in the *Saturday Magazine*, Vol. XI., p. 191.

We conclude with a list of the wild flowering plants of England which mostly grow upon a chalky soil. For the sake of greater simplicity these have been referred to their natural habitats, or localities, viz.,—

I. PASTURES.

English Names.	*Latin Names.*
Spiked Speedwell	*Veronica spicata.*
Pasque Flower	*Anemone Pulsatilla.*
Common Burnet	*Poterium Sanguisorba.*
Common Burnet Saxifrage	*Pimpinella saxifraga.*
Clustered Bell-flower	*Campanula glomerata.*
Common Dropwort	*Spiræa Filipendula.*
Cow Grass	*Trifolium medium.*
Sulphur-coloured Trefoil	*Trifolium ochroleucum.*
Spring Vetch	*Vicia lathyroides.*
Narrow-leaved Vetch	*Vicia angustifolia.*
Ladies' Traces	*Spiranthes autumnalis.*
Meadow Oat-grass	*Avena pratensis.*
Lesser Meadow Rue	*Thalictrum minus.*
Narrow-leaved Flax	*Linum angustifolium.*
Bastard Toad Flax	*Thesium linophyllum.*
Autumnal Gentian	*Gentiana Amarella.*
Fly Orchis	*Ophrys muscifera.*
Bee Orchis	*Ophrys apifera.*
Spider Orchis	*Ophrys aranifera.*
Late Spider Orchis	*Ophrys arachnites.*
Spotted Cat's Ear	*Hypochæris maculata*
Blue Erigeron	*Erigeron acre.*
Mountain Meadow Saxifrage	*Seseli Libanotis.*

2. FIELDS.

Candy Tuft	*Iberis amara.*
Red Hemp Nettle	*Galeopsis Ladanum.*
Corn Hedge Nettle	*Stachys arvensis.*
Ploughman's Spikenard	*Conyza squarrosa.*
Common Kidney Vetch	*Anthyllis vulneraria.*
Rough Trefoil	*Trifolium scabrum.*
Mongrel Poppy	*Papaver hybridum.*
Broad-leaved Bur Parsley	*Caucalis latifolia.*
Three-horned Bedstraw	*Galium tricorne.*

3. CORN-FIELDS.

Field Larkspur	*Delphinium consolida.*
Small Bur Parsley	*Caucalis daucoides.*

4. BORDERS OF FIELDS.

Common Parsnep	*Pastinaca sativa.*
Bristly Helminthia	*Helminthia echioides.*

5. BANKS.

Drone Orchis	*Ophrys fucifera.*
Green Musk Orchis	*Ophrys monorchis.*
Squinancy Wort	*Asperula cynanchi*
Creeping-rooted Toad Flax	*Linaria repens.*
Tufted Horse-shoe Vetch	*Hippocrepis comosa.*

6. HEDGES.

Common Berbery	*Berberis vulgaris.*
Hairy St. John's Wort	*Hypericum hirsutum.*
Orpine	*Sedum Telephium.*
Honewort	*Sison amomum.*

7. WOODS AND THICKETS.

Green Hellebore	*Helleborus viridis.*
Bear's Foot	*Helleborus fœtidus.*
Wood Hawkweed	*Hieracium sylvaticum.*
Hairy Violet	*Viola hirta.*
Sweet Milk Vetch	*Astragalus glycyphyllos.*
Almond-leaved Spurge	*Euphorbia amygdaloides.*
Bird's-nest Neottia	*Neottia Nidus avis.*

8. BUSHY HILLS.

Mountain St. John's Wort	*Hypericum montanum.*
Common Juniper	*Juniperus communis.*
Brown Orchis	*Orchis fusca.*

9. MOUNTAINOUS HEATHS.

Purple Mountain Milk Vetch	*Astragalus Hypoglottis.*

10. HILLS AND DOWNS.

Perennial Flax	*Linum perenne.*
Base Rocket, or Wild Mignonette	*Reseda lutea.*
Saint-foin	*Onobrychis sativa.*
Perfoliate Yellow-wort	*Chlora perfoliata.*
Monkey Orchis	*Orchis tephrosanthos.*
Dwarf Orchis	*Orchis ustulata.*
Military Orchis	*Orchis militaris.*
Mountain Cineraria	*Cineraria campestris.*

11. CLIFFS.

Common Fennel	*Fœniculum vulgare.*
Red Valerian	*Centranthus latifolius.*
Nottingham Catchfly	*Silene nutans.*

12. CHALK-PITS.

Wild Tulip	*Tulipa sylvestris.*
Green Man Orchis	*Aceras anthropophora,* (and on Banks.)

13. WASTE-GROUND.

Stinking Groundsel	*Senecio viscosus.*
Least Lettuce	*Lactuca saligna.*
Fetid Borkhausia	*Borkhausia fœtida.*

SEASONAL WILD FLOWERS.

JULY.

O 'tis a sight the soul to cheer,
The promise of the fruitful year,
When God abroad his bounty flings,
And answering nature laughs and sings!
He "for the evil and the good,"
For them, who with heart's gratitude
And them who thanklessly receive,
The blessings He vouchsafes to give,
Bids from his storehouse in the skies
"His rain descend, his sun arise*."

— MANT'S *British Months.*

COLD must be the heart of that individual, who can look abroad upon a July landscape, rich with blessings as it is rich in verdant loveliness and grace, without some sense of the bounty of that Divine hand,

That, ever busy, wheels the silent spheres!
Works in the secret deep; shoots, steaming, thence
The fair profusion that o'erspreads the Spring;
Flings from the sun direct the flaming day;
Feeds every creature.

The waving corn is the grand object of interest during this and the coming month, but as our subject leads us to the minor features of the landscape, we give but a passing notice to this bounteous provision for man; we tread the paths that lead through the midst of it, rejoicing as we go, and watching the golden waves of the sea-like expanse, as thep rise and fall before the summer gale. There is a pleasant sound like the rushing of waters in the movement of so many thousand tall blades, and as we keep the little foot-track that separates their hosts, we might almost fancy that we were indeed passing through waters that raise themselves as a wall on either side.

But if we turn our attention from the scene around us to the little hard-worn path we are walking on, we see some beautiful unaspiring plants, taking refuge at the feet of the tall blades, and apparently bearing the same relation to them as the low and scanty underwood to the noble denizens of the forest. One of the prettiest of these is a plant already named, but not described, that is, the common scarlet Pimpernel (*Anagallis arvensis*), belonging to the Primrose Tribe, and well known to country-people as the "Poor Man's Weather-glass." And right well is it entitled to the name, for duly at the approach of wet weather do its bright eyes close, thus giving warning to the peasant of the coming rain. It has also been remarked of this sensitive flower that in fine weather it opens from eight in the morning till four in the afternoon, so that the peasant

Can in the pimpernel's red tinted flowers,
As close their petals, read the measured hours.

The flowers of this plant are very small, and consist of one bright round petal, of a deep scarlet colour, with a violet centre. Though so minute a plant, it can scarcely fail to attract notice, because what it wants in magnitude it makes up for in brilliancy. The leaves and stems lie on the ground, and the flowers rise but a few inches above it. The leaves are egg-shaped, and frequently dotted with black on the under side; they are seated on the stem without any leaf-stalk. The species we are now describing continues to give out a succession of blossoms from June to September. It sometimes comes up as a weed in garden-ground, and there, if we were permitted to dictate on the subject, it should remain under certain restrictions. We remember a garden in which it was suffered to occupy a sunny spot in front of the greenhouse, and certainly never did pimpernel so glory in its honours. The plant acquired a size and growth altogether different from those of its relations in the corn-fields, while the number and brilliancy of the scarlet flowers excited general admiration. It was necessary to check in some degree the spreading of its roots; but as it is an annual plant, its luxuriant growth was not of much consequence.

The scarlet pimpernel is the common species, and may be seen in almost every neighbourhood; but the blue pimpernel, which is probably only a variety of this, is a rare plant only to be met with in particular districts. It is of the same size and form as the scarlet, but the colours are reversed; instead of a scarlet petal with a blue or violet centre, it has a blue petal with a spot of rich carmine colour in the centre.

The ruby and the amethyst
In it are lovely met,
This, in each petal bright impressed,
That, in the middle set.

The districts in which the blue pimpernel is found wild are said to be the neighbourhood of Mitcham, in Surrey; Bredon-hill, in Worcestershire; near Histon, in Cambridgeshire, the South Downs near Brighton, and some parts of Devonshire. This plant, on account of its rarity, is sometimes admitted where its more common but not less beautiful relation would be despised. The seeds may be sown soon after they are ripe on a border of light earth, or it may be increased by cuttings, which if placed in a hot-bed will produce flowers in about six weeks.

Before we leave the Pimpernel family we must name another and a perennial species growing on wet heaths and meadows, and called the Bog Pimpernel (*Anagallis tenella.*)

Amid the lone and heathy wild
Where cultivation never smiled,
And man, with undelighted eye
Passes the desert region by;
Lo, there *Tenella* makes her bed,
And lifts unseen her modest head.

Of fairer form and brighter hue
Than many a flower that drinks the dew,
Amid the garden's brilliant show,
Where scarce the roughening breeze may blow,
Her charms the graceful flower unveils
And bends beneath the moorland gales.

The bog pimpernel yields to none of our wild plants in elegance, but it is comparatively rare. The plant itself does not greatly differ from the other species, but the flowers are larger, and rise erect on slender stalks, much longer than the leaves. They are of a beautiful rose-colour.

Without pausing to notice the various minute plants that are to be found in the corn-field along with the scarlet pimpernel, we will proceed to seek in yonder lane, or on the high land to which it leads, for one of our chief favourites among July flowers. It is the round leaved Bell-Flower, or Hare-bell of Scotland (*Campanula rotundifolia.*) The root-leaves of this plant are round, but they wither very soon, so that when the harebell is in blossom, the stem-leaves alone, of which the lower are lanceolate, the upper linear, are to be seen. The stem is very slender and wiry, about a foot high, and bears a pale trembling bell of purest azure, so fragile-looking, and yet so hardy, so lovely, and yet so unassuming, that it well deserves to be the subject of the pretty lines at the close of this article.

Sometimes—though rarely—the flowers of the wild hare-bell are white; the plant blossoms abundantly in July and August, and wherever it is seen, it indicates an unfruitful soil. Sir James Smith gives a description of ten species of Bell-flower, but the greater part of them are rare, and it is not desirable to trouble our readers with their names.

The Wild Teazle (*Dipsacus sylvestris*) may now be seen in many of our hedges. This is a member of a very curious family of plants, and it is supposed that the fullers' teazle, so extensively used by clothiers, is only a variety of this plant. The name *dipsacus* is

* Matthew v. 45.

derived from *dipsao*, to thirst, and is given on account of the upper leaves of the plant holding water. They do this to so great a degree, that after a shower we have poured from the various leaves what would be a very acceptable supply of water to a thirsty traveller. The blossoms of the teazle are lilac-coloured, numerous, and collected in a large conical head. The plant grows to the height of about four feet, and its large lance-shaped leaves are defended, as is the whole plant, with an abundance of prickles. The fullers' teazle is cultivated to a great extent in the West of England, and it is the bristly scales of the flower-heads that render the plant so valuable in dressing cloth. These bristles are just strong enough to raise the wool without tearing the cloth. The dressing of one piece of cloth is said to require from fifteen hundred to two thousand teazles. When the common teazle is in blossom, it is a great ornament to our hedgerows, from the delicate colour of the flowers, but soon after the blossoming is over the receptacle becomes dry and brown, and remains long on the stalk in that condition.

The most magnificent of wild flowers is now in blossom, for we may justly so call the Great White Water-Lily, of our ponds and slow running rivers. The flowers are frequently four or five inches in diameter, and are equally rich and delicate in their appearance, while they emit a faint but pleasing scent. Expanding only in the middle of the day, and in sunny weather, these beautiful flowers are sufficiently rare to be prized by every one, and we find them carefully cultivated in sheets of water or ponds in ornamental grounds.

> There the bright water-lilies blow,
> Their stems with gorgeous blossoms crown'd,
> 'Mid shield-like leaves that float around.

Most of the species repose their closed blossoms on the wave or sink beneath it during the night, and are only stimulated by the brightness of a fine day to rise a few inches above the surface, and unfold their beautiful petals.

> Those virgin lilies all the night
> Bathing their beauties in the lake,
> That they may rise more fresh and bright
> When their beloved Sun's awake.

The root of the water-lily is tuberous, sending down a number of long stout fibres. The leaves are heart-shaped, with lobes at the base, the flowers are pure white with yellow stamens and pistil. A grey dye is obtained from the stems of this plant, and a brown dye from the roots. The Swedes, in time of dearth, have used the roots as a substitute for corn; but in order to be made palatable, the tubers require frequent washings to divest them of their bitter taste. The Egyptians also eat the roots boiled, and convert the seed into bread.

There is an extensive family of plants which we now proceed to notice, not for the peculiar beauty or interest of its species, but because we can scarcely take a step in the country at this season of the year without encountering some one or other of them. This is the Hawkweed family, (*Hieracium*) of which we find sixteen species described by Withering, all of which have yellow or orange-coloured flowers. It is called the *Hawkweed* family, because it was the belief of the ancients that hawks sharpened their sight with the juice of this weed, on which account the French also call it *Epervière* and *Herbe à l'Epervier*. There are as many as thirty-seven exotic species, most of which are regarded as weeds. In the parterre they have an agreeable rustic appearance when in flower, which is from Midsummer to the end of Autumn. These plants belong to the same tribe as the Dandelion, (the Composite tribe) and will easily be recognised by their general likeness to that flower, although in size and habit the differences of some of the species are great. The blossom consists of numerous perfect strap-shaped florets united into one head or disk. These blossoms are seated either singly or several together on rather tall stalks, which in many of the species are destitute of leaves, or possess but one or two small lance-shaped leaves. Some of these plants grow profusely on dry banks and pastures, others in woods, or on old walls, or among rubbish, others by the sides of rivers, or in marshy places, so that wherever we go we may get specimens of hawkweed, if we know enough of the nature of Composite flowers to distinguish them among the numerous blossoms of July. As we noticed when speaking of the Dandelion, the composite flowers having *strap-shaped* florets are remarkable for their stems yielding a milky juice of a soporific quality. This is the case with the Hawkweed, as well as with the endive and lettuce, also belonging to this tribe.

It would be pleasant to dwell on many other families of plants and to collect poetical and other notices respecting the more remarkable of their species; but where shall we stop if we attempt anything like a general catalogue of flowers? The description of the various kinds of trefoil, cranesbill, St. John's wort, thistle, chamomile, orchis, yarrow, hedge-mustard, poppy, saxifrage, stonecrop, willow-herb, thrift, mullein, bindweed, &c., now in blossom might soon fill our pages to the exclusion of other subjects, and we therefore reluctantly turn away from plants that are endeared to us by many pleasing associations, and bid adieu for the season to July flowers.

THE BELL-FLOWER.

With drooping bells of clearest blue,
Thou didst attract my childish view,
Almost resembling
The azure butterflies that flew
Where on the heath thy blossoms grew
So lightly trembling.

Where feathery fern and golden broom
Increase the sand-rock cavern's gloom
I've seen thee tangled,
'Mid tufts of purple heather bloom
By vain Arachne's treacherous loom
With dew drops spangled.

Mid ruins tumbling to decay,
Thy flowers their heavenly hues display,
Still freshly springing,
Where pride and pomp have passed away
On mossy tomb and turret grey,
Like friendship clinging.

When glow-worm lamps illume the scene,
And silvery daisies dot the green,
Thy flowers revealing,
Perchance to soothe the fairy queen,
With faint sweet tones on night serene
Thy soft bells pealing.

But most I love thine azure braid
When softer flowers are all decayed
And thou appearest,
Stealing beneath the hedge-row shade,
Like joys that linger as they fade,
Whose last are dearest.

Thou art the flower of memory;
The pensive soul recalls in thee
The year's past pleasures;
And, led by kindred thought, will flee,
Till back to careless infancy,
The path she measures.

Beneath autumnal breezes bleak
So faintly fair, so sadly meek,
I've seen thee bending,
Pale as the pale blue veins that streak
Consumption's thin, transparent cheek,
With death-hues blending.

Thou shalt be sorrow's love and mine;
The violet and the eglantine
With Spring are banished,
In Summer pinks and roses shine,
But I of thee my wreath will twine
When these are vanished.

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